TITLE OF THE INVENTION

[1] I, Paul Gait, a citizen of United States, residing at 4960 Onondage Road, Syracuse, NY 13215; has invented a new and useful "Lacrosse Head With Metal Frame."

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BACKGROUND OF THE INVENTION

[3] The present invention relates generally to implements used in playing lacrosse and, more particularly, to a lacrosse head having internal metal supports.

[4] Lacrosse is a fast growing sport in which one the main pieces if equipment is a lacrosse stick. The lacrosse stick comprises a handle attached to a lacrosse head. It will be appreciated by those of ordinary skill in the art that a well constructed lacrosse head is essential in both the general play by, and especially the success of, participants of the sport.

[5] The lacrosse head can be described as a basket that attaches to the end of the handle that is used to catch, transport, and deliver the ball as desired. The lacrosse head not only catches the ball and holds the ball during play, but it is also used

during defensive maneuvers and to obtain the ball during a face off. As such, the lacrosse head is subjected to larges forces during the game.

[6] These forces are compounded by the fact that the lacrosse head is at the distal end of the handle. This placement creates an increased amount of torque and momentum about the hands of the player holding the stick. The placement of the lacrosse head also adds weight to the stick and adds weight specifically to the end of the stick. As such, the lighter the lacrosse head is, the easier it is for the player to manipulate the lacrosse head during the game. However, when weight is removed from the lacrosse head, the structure of the head is normally weakened. As such, there is a struggle between reducing the weight of the lacrosse head in order to increase the playability of the lacrosse head and, at the same time, maintaining the strength of the lacrosse head to maintain the playability of the lacrosse head. This struggle is further conflicted by the various governing bodies over the lacrosse game that require the lacrosse stick, including the lacrosse head, to maintain specific internal and external dimensions.

[7] There have been several patents that have attempted to strengthen the lacrosse head by either adding various external support features or manipulating the configuration of the lacrosse head. For example, U.S. Patent Nos. 5,178,397, 5,048,843, 6,066,056, 6,283,879 5,938,550, 5,651,549, 4,657,260, 4,270,756, and 4,138,111 have all been prior art attempts to increase the playability of the lacrosse head. All these prior art patens have failed to appreciate the manipulation of the internal components of the lacrosse head in order to achieve a better lacrosse head.

[8] U.S. Patent No. 5,685,791 issued to Feeney on November 11, 1997 discloses a composite lacrosse stick having a lacrosse head formed of fibers in a matrix binder material. This patent in fact teaches away from using metal as part of the lacrosse head.

[9] None of these prior art lacrosse heads recognize the benefits of internally altering the materials that comprise the lacrosse head in order to make the lacrosse head stronger and stiffer while decreasing the weight of the lacrosse head. These prior art patents fail to recognize the ability to vary the material used to create the lacrosse head through the use of adding a metal frame or metal reinforcing supports within a plastic shell, or casing, to increase the playability of the lacrosse head. Also, these prior art patents fail to recognize the ability to internally strengthen various locations within the lacrosse head that receive the most stress during the play of the game. All of the patents and documents referenced in this application are hereby incorporated by reference in their entirety.

[10] What is needed, then, is a lacrosse head that has an internal metal support. This internal metal support can span the entire length of the lacrosse head or can be restricted to specific areas within the lacrosse head that experience increased stress during the use of the lacrosse head. The internal metal support can be implemented within the lacrosse head in such a way to maximize strength and minimize weight of the lacrosse head. This type of lacrosse head is presently lacking in the prior art.

BRIEF SUMMARY OF THE INVENTION

[11] The present invention discloses a lacrosse head having internal metal supports within a plastic casing. The internal metal supports can comprise an entire metal frame running throughout the lacrosse head or can be positioned as sections supporting areas of increased stress within the lacrosse head. The lacrosse head can be part of a lacrosse stick that also includes a lacrosse handle. The lacrosse head includes a throat to which the handle of the lacrosse stick is attached. Also included are sidewalls extending from the throat at throat transition areas. Attached to the sidewalls opposite the throat is a scoop. The scoop is attached to the sidewalls at a scoop transition area. The scoop is also shaped to facilitate collection of the lacrosse ball during play of the game.

[12] Through research it has been determined there are locations within a lacrosse head that experience increased amounts of stress during the game. These areas, or points, of increased stress typically include transition areas and connection areas within the lacrosse head. For example, one location of increased stress is the transition area between the scoop and the sidewalls. Another location of increased stress is the transition area between the throat and the sidewalls. Still another area of increased stress is the connection location between the lacrosse head and the lacrosse handle, specifically in the area of the throat. This includes the area located at the throat base to which the end of the lacrosse handle abuts.

As such, the various embodiments of the current invention are configured to add at least one internal metal support to at least one increased stress location to

increase the playability and strength of the lacrosse head while reducing the overall weight.

[13] Accordingly, one object of the present invention is to provide an improved lacrosse stick.

[14] Another object of the present invention is to provide an improved lacrosse head.

[15] Still another object of the present invention is to provide a lacrosse head with internal metal supports.

[16] Yet another object of the present invention is to provide a lacrosse head with an internal metal frame.

[17] Still yet another object of the present invention is to provide a lacrosse head that has internal metal support located at points within the lacrosse head that experience increased stress during use of the lacrosse head.

[18] Still yet another object of the present invention is to provide a lacrosse head with internal metal supports in the scoop transition area.

[19] Yet still another object of the present invention is to provide a lacrosse head with internal metal supports at the throat transition area.

[20] Another object of the present invention is to provide a lacrosse head with internal metal supports at the handle connection area.

[21] Yet another object of the present invention is to reduce distortions of the lacrosse head.

[22] Yet another object of the present invention is to reduce lateral, longitudinal, and axial distortions of the lacrosse head.

[23] Still another object of the present invention is to provide a lacrosse head with textured internal metal supports.

[24] Still another object of the present invention is to provide a lacrosse head with textured internal metal supports to facilitate reinforcement of the lacrosse head.

[25] Numerous other objects, features and advantages of the present invention will be readily apparent to those skilled in the art, upon a reading of the following disclosure, when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[26] Fig. 1 is a plan view of one embodiment of the general shape of a lacrosse head.

[27] Fig. 2A is a cross-sectional view drawn along line 2-2 of Fig. 1. Fig. 2A shows an embodiment of one possible configuration of metal supports within the throat transition areas and the scoop transitions areas.

[28] Fig. 2B is a cross-sectional view drawn along line 2-2 of Fig. 1. Fig. 2B shows an embodiment of one possible configuration of metal supports within the lacrosse head.

[29] Fig. 3A is a cross-sectional view drawn along line 3-3 of Fig. 1. Fig. 3A shows one embodiment of a support at the throat base.

[30] Fig. 3B is a cross-sectional view drawn along line 3-3 of Fig. 1. Fig. 3B an alternate embodiment of a support at the throat of a lacrosse head.

[31] Fig. 4 is a plan view of one embodiment of a metal frame that could be placed within a plastic covering of a lacrosse head.

[32] Fig. 5A is a side view of an alternate embodiment of a metal frame that could be placed within a plastic casing of a lacrosse head.

[33] Fig. 5B is a plan view of an alternate embodiment of a metal frame that can be placed within a plastic shell of a lacrosse head.

[34] Fig. 6A is an axial cross-sectional view showing one embodiment of the metal support in a tubular shape.

[35] Fig. 6Bis an axial cross-sectional view showing an alternate embodiment of the metal support in a tubular shape and including texture.

[36] Fig. 7A is an axial cross-sectional view showing an alternate embodiment of the metal support having bent sections forming an angle. This embodiment can also be described as "L" shaped.

[37] Fig. 7B shows an alternate axial cross-sectional embodiment of the metal shown in channel form. This embodiment can also be described as "H" shaped.

[38] Fig. 7C shows an alternate axial cross-sectional embodiment of the metal shown in a "C" shape.

[39] Fig. 8 is a longitudinal cross-sectional view of one embodiment of the metal support showing an example of texturing on the metal support.

[40] Fig. 9 shows an alternate axial cross-sectional embodiment of the metal shown in with an offset section.

[41] Fig 10 is a longitudinal cross-sectional view of one embodiment of the metal support showing an example of helical texturing on the metal support.

[42] Fig. 11A is an axial cross-sectional view showing an alternate embodiment of the metal support having an obtuse angle.

[43] Fig. 11B is an axial cross-sectional view showing an alternate embodiment of the metal support having an acute angle.

DETAILED DESCRIPTION OF THE INVENTION

[44] Referring now generally to Figs. 1-11B, there is shown generally at 10 the lacrosse head of the present invention. The lacrosse head 10 is part of the lacrosse stick 100 which comprises the lacrosse handle 102 and the lacrosse head 10. The lacrosse head 10 includes a throat 12 positioned and shaped to accept the lacrosse handle 102. The throat 12 includes a cavity 14 shaped to generally conform to the shape of the lacrosse handle 102. The throat 12 also includes a throat base 16 located on the throat 12 opposite the opening of the cavity 14. The throat base 16 is also positioned between throat transition area 18 and throat transition area 20.

[45] Sidewalls 22 and 24 extend away from the throat 12 and attached to the throat transition area 18 and 20, respectively. The sidewalls 22 and 24 are attached to scoop 26 at scoop transition areas 28 and 30. The throat 12, sidewalls 22 and 24, scoop 26 and transition areas 18, 20, 28, and 30 combined to define the

general perimeter of the lacrosse head 10 as well as to define a net area 32 used to interact with the lacrosse ball (not shown) during playing of the lacrosse game.

[46] In a preferred embodiment of the present invention the lacrosse head 10 includes a plastic casing 34 surrounding a textured metal frame 36. A plastic casing 34 can also be described as a plastic shell 34 or plastic covering 34. Preferably the plastic casing 34 is molded from Dupont Xytel plastic. Generally, the plastic casing 34 can be composed of plastic materials known in the art to possess enhanced wear characteristics while having a minimal weight. Preferably the plastic casing 34 is molded over the metal frame 36. However, the metal frame 36 can have various spatial configurations within the plastic shell 34.

[47] In alternate embodiments, the metal frame 36 can be comprised of a plurality of internal metal reinforcements 38, or internal metal support 38, an example of which is seen in Fig. 5a. Alternately, the metal frame 36 can be a connected unit as shown by example in Figs. 4 and 5b. The metal frame 36 and the internal metal reinforcements 38 preferably are completely enclosed by the plastic shell 34. This encasing is to protect players of the lacrosse game from injury as well as to protect their equipment and items from exposure the metal.

[48] In a preferred embodiment, the metal is titanium, while an alternate embodiment the metal can be aluminum or other forms of metal known in the art to provide sufficient strength and rigidity at a minimal weight for use in lacrosse heads. In one embodiment, the metal is composed of wire. In an alternate embodiment, the metal is composed of tubing, as seen in Figs. 6A-6B.

[49] In one embodiment, a first metal section 40 and a second metal section 42 are positioned within the plastic casing 34 to form at least one an angle 41 between the metal sections 40 and 42. This angle 41 is preferably approximately 90 degrees, however the angle can be acute or obtuse. In still another alternate embodiment, the metal can be in a channel form as seen in Fig. 7B. In actuality, the metal can take various shapes known in the art to provide various forms of longitudinal, axial, and/or shear resistance. This embodiment can alternately be described as including a metal reinforcement bent to form an angle 41, or as a first metal section 40 and a second metal section 42 attached to form an angle 41.

[50] As seen in Figs. 2A-5B the metal can have various shapes and configurations to conform to the plastic casing 34 and the desired shape and strength requirements of a user of the lacrosse head 10. Alternately described, the general plastic casing 34 can conform to the general shape of the metal frame 36 to result in a properly supported lacrosse head 10.

[51] As seen in Figs 2A-2B, the metal reinforcements 38 can conform to various shapes of the side walls 22 and 24 and can be positioned in side walls 22 and 24 that have both upper and lower armatures. Alternately, the metal reinforcements 38 can be placed in only the upper or lower armature as needed to properly support the side walls 22 or 24.

[52] Preferably, the metal is textured to allow a better engagement with the plastic shell 34. As seen in Figs. 6B, and 8 -10, the texture can included various forms of surface enhancement to the metal. For example, Fig. 8 shows an example

of corrugated wire. Corrugated tubing and corrugated metal lengths could also be used. Figure 10 shows an example of helically positioned supports 35 around the outer surface 33 and along the length 31 of the metal frame 36. Figure 9 shows an example of an offset section 37 of the metal frame 36. Other examples of textured metal that could be used are rebar, threaded metal, ruffed wire, and the like.

[53] As previously mentioned, one embodiment of the lacrosse head 10 comprises a plurality of internal metal reinforcements 38 and a plastic shell 34 covering the internal metal reinforcements 38. As such there are various areas, or locations of increased stress 43 throughout the plastic shell 34. Some of these areas of increased stress can be described as areas of maximum stress 43 within in the plastic covering 34. As such, the at least one area of increased stress 43 includes at least one internal metal reinforcement 38 such that the metal reinforcement 38 provides a support for the lacrosse head 10 against deflection during the use of the lacrosse head 10.

[54] Preferably each location of the increased stress 43 includes at least one internal metal support 38. Normally, the areas of increased stress 43 include the throat transition areas 18 and 20, the scoop transition areas 28 and 30, and the throat base 16. As such, it is desirable to position the internal metal reinforcements 38 and/or the metal frame 36 within these areas of increased stress 43. Namely, the throat base 16, and transition areas 18, 20, 28 and 30 are ideally supported and reinforced by the metal frame 36 or the individual internal metal reinforcements 38.

[55] Normally, the weak areas within a lacrosse head 10 are the transition areas 18, 20, 28, and 30 and the connection area, with the lacrosse handle 12. As such, these are the areas that can be preferably reinforced for the use of a metal frame 36 or metal reinforcements 38. In a preferred embodiment, the lacrosse head 10 includes at least one internal textured metal reinforcement 38 located in each scoop transition area 28 and 30. In this embodiment, the metal reinforcement 38 is textured similar to rebar.

[56] Thus, although there have been described particular embodiments of the present invention of a new and useful Lacrosse Head With Metal Frame, it is not intended that such references be construed as limitations upon the scope of this invention except as set forth in the following claims.